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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,317	07/11/2003	Guolin Ma	10020800-1	4776

57299 7590 02/22/2006

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EXAMINER	
HOLTON, STEVEN E	

ART UNIT	PAPER NUMBER
2673	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/618,317	MA ET AL.	
	Examiner	Art Unit	
	Steven E. Holton	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-8,12 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-8,12 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is made in response to applicant's amendment filed on 12/8/2005. Claims 1, 3-8, 12, and 13 are currently pending in the application. An action follows below:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelka et al. (USPN: 6637924), hereinafter Pelka, in view of Dimmick (USPN: 5151679) and further in view of Butterworth et al. (USPN: 5847507), hereinafter Butterworth.

Regarding claim 1, Pelka discloses an optical conduit (Figs. 11-15 element 70) with an input end (Figs. 11-15, element 74), an output end (Figs. 11-15, element 80) and a curved surface that totally and internally reflects light from the input end towards the output end (col. 14, lines 8-19). Pelka further discloses a light source (Fig. 14, element 12) but does not expressly disclose that the light sources are embedded at the input end of the body. Nor does Pelka discuss a reflector cup embedded at the input end of the body and surrounding the light source to redirect light towards the output end of the body.

Dimmick discloses a light pipe (Fig. 3, element 80) with a light source (Fig. 3, element 90) of a light emitting diode (LED) embedded in an end of the light pipe (col. 6, lines 33-41 and col. 11, lines 22-27).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Pelka and Dimmick to produce a optical conduit with a curved surface and with a light source embedded within the optical conduit. The motivation for doing so would have been so that the light source only provides illumination to the light conduit and display areas beyond the conduit rather than losing light to surrounding areas and to reduce maintenance and cost of operation (Dimmick, col. 3, line 63 – col. 4, line 1). However, the combination of Pelka and Dimmick does not expressly disclose, "a reflector cup embedded at the input end of the body and surrounding the light source, the reflector cup configured to redirect light from the light source towards the output end of the body."

Butterworth discloses a light emitting diode comprising a light source (Figs, 1 and 2, element 110) that is surrounded by a reflector cup (Figs. 1 and 2, element 120). The reflector cup redirects light so that most of the light is directed in a chosen direction from the LED.

At the time of invention it would have been obvious to one skilled in the art to use a LED light source such as the one described by Butterworth as the light source for a system made from the combination of Pelka and Dimmick. The motivation for doing so would have been to utilize a light emitting diode source that is efficient and produces light over a broad portion of the visible spectrum (Butterworth, col. 2, lines 7-16). By

using the LED described by Butterworth a reflector cup would also be provided within the optical conduit body surrounding the light source and directing light in the direction of the output part of the optical conduit. Therefore, it would have been obvious to combine the teachings of Pelka, Dimmick, and Butterworth to produce a device as specified in claim 1.

Regarding claim 4, Pelka discloses the use of various shapes for a light conduit (Figs. 11-13). The Examiner notes that the shape of the conduits shown in Figs. 12 and 13 are non-symmetrical. Such figures could be broken into segments where different areas of the walls could be shown to fit different equations. Thus, it would have been a matter of design choice for one skilled in the art to provide an optical conduit with surface sections fitting different equations as shown by Pelka.

Regarding claim 5, Pelka discloses using a light emitting diode as the light source (Fig. 14, element 12). And Dimmick also discloses using a light emitting diode as the light source (Fig. 3, element 90).

Regarding claim 7, Pelka discloses that the light conduit (Figs. 11-15, element 70) can be formed with the middle using materials such as "glass or polymer-based materials" (col. 14, lines 12-14) and that the optical conduit could also be made out of "acrylic, polycarbonate, and silicone" (col. 14, lines 20-22).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pelka in view of Dimmick and Butterworth as applied to claim 1 above, and further in view of Zimmerman et al. (USPN: 6869206), hereinafter Zimmerman.

Regarding claim 3, as shown above the combination of Pelka, Dimmick, and Butterworth disclose all of the limitations of claim 1 that are part of claim 3. However, the do not expressly disclose providing the optical conduit as a paraboloid. Zimmerman discloses an optical pipe for transmitting light from an input to output that uses a parabolic shape (Fig. 11, element 426 and col. 13, line 63 – col. 14, line 2). The Examiner notes that the figure shown is a cross-section of the optical pipe and the three dimensional light pipe would then have a paraboloid shape.

It would have been obvious for one skilled in the art at the time of invention to use an optical guide using a parabolic shape as disclosed by Zimmerman as the optical guide used by the combination of Pelka, Dimmick, and Butterworth. This would have been a matter of design choice to utilize such a specific shape rather than a non-specified shape. Pelka, in Figs. 11-13, shows the use of different shapes and Zimmerman also shows different shaped conduits including non-curved shapes in Figs. 11 and 12. Thus it would have been obvious to make the optical conduit into a paraboloid shape to produce a device as specified in claim 3.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pelka in view of Dimmick in view of Butterworth as applied to claim 1 above, and further in view of Son (USPN: 6741234).

Regarding claim 6, the combination of Pelka, Dimmick, and Butterworth disclose all of the limitations except, "wherein the body has a gradual bend so that the output end is at an angle to the input end, wherein the angle is at most 90°."

Son discloses an optical conduit (Fig. 18, element "light-emitting lens") for use in an optical mouse where the conduit has a gradual bend so that the output end and the input end are at an angle different from each other. The angle of difference of the input and output ends of the optical conduit are less than 90°.

At the time of invention it would have been obvious to one skilled in the art that the shape of the optical conduit could be constructed into a variety of shapes. Further, in view of the teachings of Pelka and Son, it would have been a matter of design choice for one skilled in the art to produce an optical conduit with a curve so that the input and output ends are at an angle to each other. The design choice would be so that the optical conduit would fit within the housing along with other components of the optical mouse. Thus, it would have been obvious to one skilled in the art to combine the teachings of Pelka, Dimmick, Butterworth, and Son to produce a device as described in claim 6.

5. Claims 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son (USPN: 6741234) in view of Zimmerman, and further in view of Dimmick and further in view of Butterworth.

Regarding claim 8, Son discloses an optical mouse with a housing (Fig. 7, element 26), an image sensor (Fig. 7, element 27) for capturing images of a surface (Fig. 7, element 28), an optical conduit made from optically transmissive material, channeling light form the light source onto the surface (Fig. 8, element "light emitting lense") with an input and output and a lens to focus the light reflecting off the surface

onto the image sensor (Fig. 7, element 25). However, Son does not expressly disclose the optical conduit having a curved interior surface, a light source embedded within the optical conduit or a reflector cup embedded within the optical conduit and surrounding the light source.

Zimmerman discloses an optical conduit having a curved interior surface (Fig. 11, element 426). However, Zimmerman does not expressly disclose having the light source embedded within the input end of the optical conduit.

At the time of invention it would have been obvious to one skilled in the art to modify the teachings of Son with the teachings of Zimmerman to produce an optical mouse that utilizes a light emitting lense with a curved interior surface rather than a system with straight interior surfaces as depicted by Son. As shown by the different geometries of optical conduits used by Zimmerman in figures 11 and 12, it would have been a matter of design choice for one skilled in the art to pick a shape of optical conduit of any type desired to direct light to the desired output location. However, the combination of Son and Zimmerman do not expressly disclose embedding the light source into the optical conduit, nor embedding a reflector cup around the light source to direct light towards the output of the optical conduit.

Dimmick discloses a light pipe (Fig. 3, element 80) with a light source (Fig. 3, element 90) of a light emitting diode (LED) embedded in an end of the light pipe (col. 6, lines 33-41 and col. 11, lines 22-27). However, Dimmick does not expressly disclose a reflector cup embedded in the optical conduit surrounding the light source to redirect light towards the exit of the optical conduit.

At the time of invention it would have been obvious to one skilled in the art to modify an optical mouse system of the combination of Son and Zimmerman with the teachings of Dimmick regarding inserting a light source into an optical conduit. The motivation for doing so would have been so that the light source only provides illumination to the light conduit and display areas beyond the conduit rather than losing light to surrounding areas and to reduce maintenance and cost of operation (Dimmick, col. 3, line 63 – col. 4, line 1). However, the combination of Son, Zimmerman, and Dimmick do not expressly disclose embedding a reflector cup that surrounds the light source into the optical conduit to redirect light towards the output of the optical conduit.

Butterworth discloses a light emitting diode comprising a light source (Figs, 1 and 2, element 110) that is surrounded by a reflector cup (Figs. 1 and 2, element 120). The reflector cup redirects light so that most of the light is directed in a chosen direction from the LED.

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Sun, Zimmerman, Dimmick, and Butterworth. The motivation for doing so would have been to utilize a light emitting diode source that is efficient and produces light over a broad portion of the visible spectrum (Butterworth, col. 2, lines 7-16). By inserting an LED such as one described by Butterworth into the optical conduit as discussed by Dimmick this would result in the optical conduit having a light source and reflector cup embedded within the optical conduit. This would produce the device as disclosed in claim 8.

Regarding claim 12, Zimmerman discloses an optical pipe for transmitting light from an input to output that uses a parabolic shape (Fig. 11, element 426 and col. 13, line 63 – col. 14, line 2). The Examiner notes that the figure shown is a cross-section of the optical pipe and the three dimensional light pipe would then have a paraboloid shape.

Regarding claim 13, the Examiner notes that the limitations of claim 13 are similar to the limitations of claim 8, but lack the requirement of having a curved interior surface within the optical conduit. Obviously a curved interior surface discussed in claim 8 would read on an interior surface as described in claim 13. Therefore, the arguments made regarding claim 8 may be further applied to the more generic claim 13.

Response to Arguments

6. Applicant's arguments with respect to claims 1, 3-8, 12, and 13 have been considered but are moot in view of the new ground(s) of rejection.

In response to the question of the Official Notice taken in the previous Office Action, the Examiner notes that previously the question was drawn to use of a reflector cup surrounding a light source to direct the light from the light source. Such use of a reflector cup is well known in the art. A common flashlight utilizes a light source with a reflector cup to direct the light. Due to the further amendment regarding inserting the reflector cup into the optical conduit, the Examiner has used the newly found prior art of Butterworth to show the use of a reflector cup surrounding the light source and embedded into the optical conduit along with the light source. Although the teachings of

some of the sources do not explicitly discuss use with an optical mouse, the teachings of these sources regard teachings of the nature of optical systems such as increasing efficiency when inserting a light into an optical waveguide rather than leaving it external to the waveguide. One skilled in the art would be able to draw the conclusion that the insertion would increase efficiency of any system utilizing an LED and optical waveguide.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven E. Holton whose telephone number is (571) 272-7903. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven E. Holton
February 19, 2006
Division 2629 (formerly 2673)

AMR A. AWAD
PRIMARY EXAMINER